

## Covered Smut of Barley

**Pathogen:** *Ustilago hordei*.

### Distribution

The covered smut of barley is world wide in its distribution. It is found in all those countries where the barley is grown. It is a common disease of barley in northern India.

### Symptoms

1. As soon as the ears of infected plants emerge out, the first symptoms easily may be seen. The smutted or blackened ears come out of the leaf sheath, which may easily be recognized from the long distance.
2. All the ears of diseased plant become infected and all the developing grain turns into smut sorus remains covered by a white shining, silvery membrane which is partially developed from host tissue and partially from fungus.
3. Due to this compact covering, the smut spores are not blown off, and thus the disease is named "covered smut".

### Nature and Recurrence of Disease

This is an externally seed borne and systematic disease. Every year the recurrence of disease takes place by the contaminated seeds. The mycelium develops from the very beginning. Along with the coleoptile and ultimately reaches the ear. During threshing the smut sori break and smut spores are released and they make the seeds contaminated again.

### Control Measures

- Roughing: The infected plant may be uprooted and burnt.
- Seed must be taken from healthy crop.
- The infected seed may be treated with organomercuric compounds such as agrosan GN. About 5 kg of seeds may be treated with 10 gm of seed disinfectant for about 15 minutes.
- The resistant varieties should be grown. Some resistant varieties are K12, CN294, C84 etc.

## Leaf Blight of Maize

**Pathogen:** *Helminthosporium turcicum*.

### Distribution

The disease is quite common in many parts of India. It was first described in Italy in 1876 and since then has been recorded from the USA, South Africa, Japan and the Philippines and most maize

growing countries.

### Symptoms

- I. The symptoms appear as small, yellowish, round or oval spots on the leaves. These extends along the leaf and coalesce into longitudinal bands, which may cover a great part of the leaf.
- II. The affected tissue gradually become dark in coloured and are being covered in moist weather with velvety dark green patches due to the fructification of the fungus.
- III. Ultimately leaves are dried up and have a blighted appearance. The plants remain stunted and the ears poorly developed.

### Recurrence of Disease

The disease survives on plant debris in the soil.

### Control Measures

- The leaf blight on maize effectively be controlled by spraying either Captan or Zineb.
- Sanitation and crop rotation should be practiced.

## Smut of Maize

**Pathogen:** *Ustilago maydis*.

### Distribution

The disease occurs in most countries where maize is cultivated. This disease occurs many parts of Europe, USA, Eurasia, India and Australia. The climatic condition which favours the disease is the damp warm weather during the period of most vigorous growth of the crop.

### Symptoms

- I. The disease appear in the form of soft tumours or galls appear on cobs, tassel's buds, Stalks and least often on the leaves and roots.
- II. Usually the first galls are seen on the leaves when the plant is more than a foot high. The galls are generally small and wrinkled, at first white, then dark form the development of spores in their interior.
- III. As the plant grows more galls appear, especially at the junction of the leaf sheath and leaf blade and at the nodes of the stem.
- IV. On the appearance of the tassels, small galls appear on the male flowers. The cob is very frequently attacked.

V. The whole ear or more often only individual flowers are affected and the large galls are formed. Sometimes the large spathes enclosing the cob are affected by large galls.

VI. Even when a few flower of the cob are attacked, the amount of grains produced may be greatly reduced, as the grains near the smut galls frequently do not develop.

### Control Measures

- Crop rotation and field sanitation might be expected to offer some control.
- To grow smut resistant varieties is the most effective method of control.

Several smut resistant hybrid varieties have been evolved and distribution among farmers.

## Leaf Spot Disease of Cotton

**Pathogen :** *Cercospora gossypina*.

### Distribution

The disease is found in many countries of the world such as USA, West Indies, Egypt, China and other cotton growing countries. In India this disease is found Sporadically in cotton growing states.

### Symptoms

- i. The disease may appear, at any stage in the growth of the plant, but chiefly when plants are fully grown. The rounded or irregular spots appear on both surfaces of the leaf.
- ii. The spots are generally 4mm in diameter. They are first yellowish-brown. Then whitish in center from the withering of the tissues.
- iii. The margin of spots consists of a distinct dark brown or a blackish rim which in young spots, may be reddish in beginning.
- iv. The adjacent Coalesce with each other forming large patches of the leaf to whiter. In old spots, the center cracks or breaks forming a hole. Badly infected leaves lose their green colour turn yellow and ultimately wither and drop it.

### Nature and Recurrence

This is soil borne disease. The mycelium and conidia survive in the soil and infect the plants in the coming season.

### Control Measures

- The exotic varieties of cotton are immune to disease.
- Since the disease is soil borne, all plants debris should be collected and destroyed by burning it.

## Angular Leaf Spot of Cotton

**Pathogen:** *Xanthomonas malvacearum*.

### Distribution

The disease occurs in all cotton growing countries of the world. The disease is responsible for heavy losses and has been supposed to be third major disease of cotton. It was first recorded in the USA (smith, 1920) where this was known as angular leaf spot.

### Symptoms

- I. On the leaves spot appear angular in shape, as the primary infection are limited by small veins. The spots are dark brown in colour and they may coalesce to form large blotches on newly formed leaves.
- II. The attack is limited to the tissue on either side of the veins. In wet weather, the narrow dark brown areas extend upto petioles. However, in dry weather condition the severely attacked leaves fall off and the plants remain barren.
- III. Elongated and discoloured areas appear on the young shoots and older branches. The stem infection are sunken and turn black from which symptoms the name "blackarm" has been derived. Such symptoms may extends many inches in length.
- IV. The bolls may be attacked at all stages of development. The young bolls may killed and fall off whereas the older bolls bear large dark spots which turn black. The seed also becomes contamination and the lint is often destroyed or rendered useless.

### Nature and Recurrence

This is a seed borne disease. The primary infection takes place through seed borne bacteria. The bacteria form slimy masses round the hairs surrounding the micropyle of the seed. On germination of contaminated seed, the bacteria infect the cotyledon as they emerge through soil and produced elongated marginal lesions. Thereafter, the leaves and stems are being infected.

### Control Measures

- Since the disease is borne, the seeds should be treated with organomercuric prior to sowing. To seeds may be soaked overnight in 1000 ppm of streptomycin sulphate.
- Since the bacteria can survive for few weeks in plant debris, the affected portions should be collected and destroyed.
- The resistant varieties should be evolved.

## Stem Rot of Jute

**Pathogen:** *Macrophomina phaseoli*

### Distribution

This is destructive disease of crop in Assam, West Bengal, Bihar, Orissa. It has also been reported from other jute growing countries (e.g. Bangladesh) of the world.

### Symptoms

- I. At first the seedlings are being attacked and the earliest symptoms appear on the hypocotyls and cotyledons in the form of brownish black streaks.
- II. When the plants become old, the shedding of leaves take place and ultimately the plants are succumbed to death.
- III. The necrotic lesion appear at the apex and along the margin of the leaves and soon after the complete leaf blade, midribs and petioles are affected. The lesion also appear on the stem in the form of blackish brown depression.
- IV. Several such lesion on the stem coalesce and most of the parts of the stem is being covered them. Often lesion spread along the stem and ultimately the cortex become shedded exposing the fibre.
- V. Root is rarely infected.

### Nature and Recurrence

This is a soil as well as seed borne disease. The primary inoculum is received from infected seed and soil in the form of pycnidia and sclerotia.

### Control Measures

- Clean seed should be sown. The seed should be obtained from those areas where the disease was not present.
- Resistant varieties should be sown.

## Blight of Gram

**Pathogen:** *Ascochyta rabiei*.

### Distribution

The disease was first reported from India in 1911 by Butler. Now this is world wide in distribution. Much damage is being done in Europe and Canada.

## Symptoms

1. All the green parts of the plants of the plants attacked. Dark lesion appear on the stem and leaves first, then on the pods.
2. On the stem, the lesion are oval or elongated. Whereas on the leaves and pods, round upto 1.25 cm in diameter. When the lesion are fully developed the margin is brown and the centre yellowish.
3. Withered and stundded with the minute, dark fructification of the fungus. Often concentrically arranged.
4. When the spot girdle the stem, the entire plants wither and ultimately die. As the attack of the disease begins from the base of the plants, which results in the death of the whole plants.

## Nature and Recurrence

The disease is both externally and internally seed borne. The fungus survive in the seed in the form of mycelium as well as pycnidia. The secondary infection takes place by means of conidia.

## Control

- Clean and healthy seed should be sown. prior to sowing the seed should be treated with suitable fungicides. Hot water treatment may be given to reduce the internal infection. The seed should be obtained from disease free areas. Blighted plants should be pulled out by hands and burned.
- Seed treatment with Thiram @ 3 gm of fungicides per kg of seed helps in reducing seed borne infection.
- Resistant varieties should be shown.

## Leaf Spot of Green gram

**Pathogen:** *Cercospora cruenta*.

## Distribution

This is wide spread disease, wherever this leguminous crop is grown.

## Symptoms

- i. The spot develop as brown or red areas with grey centres and purplish borders.
- ii. Generally the lesion are rounded, but they may be angular because of vein limitations.
- iii. Sometimes, the shot holes formed. The severe cases the plants become completely defoliated.

## Nature and Recurrence

The disease may survive in the soil along with plant debris. The infection may take place by means of

conidia found in the soil in the following season.

### Control Measures

- Sanitation and rotation should be practiced.
- Resistant varieties should be sown.

## Tikka Disease of Groundnut

**Pathogen:** *Cercospora personata* (break and curl), ELL & Ever, perfect stage- *Arachidicola berkeleyi*.

*Cercospora Arachidicola*, perfect stage- *Mycosphaerella*.

### Distribution

This is world wide disease of groundnut, and occurs in all those countries where the crop is grown. The disease occurs in the USA, many African countries, Philippines, Indonesia, India, Australia.

### Symptoms

1. All the parts of the plant found above the ground are affected, but especially the lesion appear on the leaves.
2. In the month of July, when the plants are at least 2 months old, the symptoms begin to appear and goes on upto maturity of the plants.
3. In this countries, generally the symptoms due to appear. The lesion on the leaves, developed by are *Cercospora personata* rounded and 1-6 mm in diameter. These spots are dark brown or black and found on the both surface of the leaf.
4. Later on, the yellow halo develops around each such leaf spot. The spot surrounded by yellow halos are restricted to the upper surface of the leaf.

### Nature and Recurrence

This is a soil borne disease. The primary infection is caused by means of conidia found on the plant debris in the soil. The spread of disease takes place by means of conidia which are dispersed by wind. The role of the perfect stage of the fungus is not clearly understood.

### Control Measures

- The disease can be controlled to some extent by sanitation and crop rotation.
- The use of phosphoric and K manure and mixed cropping with arhar also reduce the disease.
- The spraying with 2:2:50 Bordeaux mixture.

- Resistant varieties should be sown.

## Red Rot of Sugarcane

**Pathogen:** *Colletotrichum falcatum*.

### Distribution

The disease is undoubtedly the most serious and destructive in India. It is of common occurrence in all those countries where sugarcane growing States of our country.

### Symptoms

- I. The first external symptoms of the disease is that the upper leaves of a shoot, begin to lose colour and drop slightly.
- II. There after they wither at the tip and withering progresses down the margin, leaving the centre green. All the parts above the ground are being infected by the fungus.
- III. But the symptoms are conspicuously seen on the stem and mid ribs of leaves. The infected stems are completely rotted within the rind loses its naturally bright colour becomes dull in appearance and shrinks at the nodes.
- IV. The black dot like structure appear on the shrunked internodes. They are the acervuli of the fungus.
- V. On splitting open a cane, an alcoholic smell is emitted and the tissue are found to be reddened in one or a few internodes usually towards the base. The reddening is most intense in the vascular bundles but extends to the pith.

### Nature and Recurrence

The disease is seed borne as well as soil borne. It has been observed that the setts harbour the fungus and thus the disease is perpetual from year to year. It has also been observed that the fungus is capable of growing and producing acervuli in soil, but the primary infection is through to be mainly from infected setts.

### Control Measures

- The crop should be thoroughly inspected several times and the infected plants should be destroyed by burning them.
- The water logging condition should be avoided.
- Prior to sowing, the setts should be duly inspected.
- The Practices of sanitation should be adopted. After harvesting the crop, the stubbles and plant

debris should be destroyed carefully by burning them.

- The crop rotation of 2 years should be practiced so that the inoculum present in the soil may be destroyed completely.
- The ratooning of infected plants should always be discouraged.
- Only resistant varieties should be grown Co 453, Co 393, Co 356 etc.

## Ring Spot of Sugarcane

**Pathogen:** *Leptosphaeria sahari*.

### Distribution

This is a common disease of sugarcane in several parts of India. The disease was first described in Java and occurs in most sugarcane growing countries as the Philippines, West Indies etc.

### Symptoms

- i. The disease symptoms appear soon after the rains have commenced, when the plants are two or three months old.
- ii. The first symptoms is appearance of small discoloured. generally purple spots seen on both surface of the leaf. As these spots grow and expands at the margin. the central portion becomes dry.
- iii. The margin consists of narrow, reddish, purple or brownish band, outside which there is sometimes a yellow areola, merging into the green of leaf.
- iv. The center of the spots is dry and straw coloured and sharply marked off by the surrounding coloured ring. Small dot like structures representing fructification of the parasite are seen in rows on straw coloured spots.

### Predisposing factors

Unfavourable condition of the soil and moisture favour the disease. The disease is seen on the thick canes. Thin cane are never damaged.

### Nature and Recurrence

This is a soil borne disease. The perithecia survive in the soil along with plant debris.

### Control

Sanitation is of some use.

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